

What is claimed is:

1. A method of treating water comprising the steps of:  
exposing water desired to be treated to ozone in sufficient quantity to reduce

5 a concentration of undesired microorganisms therein; and  
flowing the water over a colony of attached algae to remove undesired matter  
therefrom.

2. The method recited in Claim 1, wherein the water-exposing step comprises  
10 the steps of injecting ozone into at least one of a mixing chamber and a body of water,  
pumping the water to be treated into the mixing chamber, and mixing the water to be  
treated with the injected ozone.

3. The method recited in Claim 1, further comprising the step, prior to the water-  
15 exposing step, of generating ozone by at least one of exposing air to ultraviolet radiation  
and creating a corona discharge.

4. The method recited in Claim 1, further comprising the step of exposing the  
water to be treated to at least one of ultraviolet radiation and acoustic energy.

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5. The method recited in Claim 1, wherein the water-exposing step comprises  
pumping the water into a bottom end of a tube, injecting ozone adjacent the bottom end

of the tube, and permitting the water and the ozone to mix while rising toward a top end of the tube.

6. The method recited in Claim 1, further comprising the step of treating the  
5 water with ozone following the water-flowing step.

7. The method recited in Claim 1, further comprising the step of passing the  
water through an activated carbon filter following the water-flowing step.

10 8. The method recited in Claim 1, further comprising the step of adding a  
pesticide to the algal colony for controlling insects, the pesticide selected from a group  
consisting of an insecticide, a pyrethroid, or a natural pyrethrum.

15 9. The method recited in Claim 8, further comprising the step of adding a  
pesticide to the algal colony for controlling insects, the pesticide comprising *bacillus*  
*therengensis isralioans*.

20 10. The method recited in Claim 9, further comprising the step of culturing  
*bacillus therengensis isralioans*, and wherein the pesticide-adding step comprises  
delivering a substantially continuous supply of *bacillus therengensis isralioans* to an inlet  
of the algal colony.

11. The method recited in Claim 1, further comprising the steps of:  
extracting the water to be treated from a body of water prior to the exposing  
step; and  
returning the treated water the to body of water following the water-flowing  
5 step.
12. The method recited in Claim 1, wherein the ozone-exposing step comprises  
covering a body of water and injecting ozone into the body of water.
- 10 13. The method recited in Claim 1, wherein the ozone-exposing step comprises:  
pumping water out of a body of water into a supply pipe;  
injecting ozone into the supply pipe; and  
directing the water to an inlet end of the algal colony.
- 15 14. The method recited in Claim 13, wherein the ozone-injecting step comprises  
injecting ozone at a plurality of injection locations along the supply pipe.
- 16 15. The method recited in Claim 1, further comprising the step, following the  
water-flowing step, of repeating the ozone-exposing step and the water-flowing step by  
20 recirculating the water emerging from the algal colony.

16. The method recited in Claim 1, further comprising the steps, following the water-flowing step, of harvesting the algal colony, adding a pesticide to the harvested algae, exposing the mixed algae and pesticide to sunlight for achieving detoxification, and using the detoxified mixed algae and pesticide to form a base for another algal colony.

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17. The method recited in Claim 16, wherein the pesticide comprises one or more pesticides selected from a group consisting of natural pyrethrum, natural pepper, garlic, elder, and lemon sage.

10 18. The method recited in Claim 1, wherein the colony is attached to a base, and further comprising the steps, following the water-flowing step, of harvesting the algal colony, adding a pesticide to the colony base, and detoxifying the base.

15 19. The method recited in Claim 18, wherein the pesticide is selected from a group consisting of a synthetic pyrethroid and a natural pyrethrum.

20 20. A system for treating water comprising:  
means for exposing water desired to be treated to ozone in sufficient quantity to reduce a concentration of undesired microorganisms therein and to liberate available nutrients therefrom;  
a colony of attached algae for removing undesired matter from the ozone-exposed water; and

means for directing the ozone-exposed water from the water-exposing means to the algal colony.

21. The system recited in Claim 20, wherein the water-exposing means  
5 comprises a mixing chamber, means for injecting ozone into the mixing chamber, a pump for pumping the water to be treated into the mixing chamber, and a mixer for mixing the water to be treated with the injected ozone.

22. The system recited in Claim 20, further comprising means for generating ozone comprising at least one of means for exposing air to ultraviolet radiation and means  
10 for creating a corona discharge.

23. The system recited in Claim 20, further comprising means for exposing the water to be treated to at least one of ultraviolet radiation and acoustic energy.  
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24. The system recited in Claim 20, further comprising:  
a tube having a bottom end and a top end;  
a pump for pumping the water into the tube bottom end and upward toward the top end;  
20 means for injecting ozone adjacent the tube bottom end of the tube, for permitting the water and the ozone to mix while being pumped toward a top end of the tube.

25. The system recited in Claim 20, further comprising means for treating the water with ozone downstream of the algal colony.
- 5           26. The system recited in Claim 20, further comprising the step of passing the water through an activated carbon filter following the water-flowing step.
- 10           27. The system recited in Claim 20, further comprising means for adding a pesticide to the algal colony for controlling insects, the pesticide selected from a group consisting of an insecticide, a pyrethroid, or a natural pyrethrum.
- 15           28. The system recited in Claim 20, further comprising means for adding a pesticide to the algal colony for controlling insects, the pesticide comprising *bacillus therengensis isralioans*.
- 20           29. The system recited in Claim 28, further comprising means of culturing *bacillus therengensis isralioans*, and wherein the pesticide-adding means comprises means for delivering a substantially continuous supply of *bacillus therengensis isralioans* to an inlet of the algal colony.
30. The system recited in Claim 20, further comprising:  
means for extracting the water to be treated from a body of water; and

means for returning the treated water the to body of water downstream of the algal colony.

31. The system recited in Claim 20, wherein the ozone-exposing means  
5 comprises a cover over a body of water and means for injecting ozone into the body of water.

32. The system recited in Claim 20, wherein the ozone-exposing means  
comprises:

10 a supply pipe having an inlet end and an outlet end;  
a pump positioned to extract water out of a body of water into the supply pipe inlet end and to pump the extracted water to an inlet end of the algal colony; and  
means for injecting ozone into the supply pipe.

15 33. The system recited in Claim 20, further comprising means for redirecting water from an outlet end of the algal colony to the ozone-exposing means for recirculating the water emerging from the algal colony.

20 34. The system recited in Claim 20, further comprising means for harvesting the algal colony following exposure to water to be treated and means for adding a pesticide to the harvested algae.

**35.** The system recited in Claim 34, wherein the pesticide comprises one or more pesticides selected from a group consisting of natural pyrethrum, natural pepper, garlic, elder, and lemon sage.

5           **36.** The system recited in Claim 20, further comprising a base to which the algal colony is attached, and further comprising means for harvesting the algal colony, means for adding a pesticide to the colony base, and means for detoxifying the base.

10          **37.** The system recited in Claim 36, wherein the pesticide is selected from a group consisting of a synthetic pyrethroid and a natural pyrethrum.